

# Spectrum Monitoring to Help Inform Spectrum Allocation Policy

Mark Gibson, Director Business Development

ISART 2020

August 12, 2020

# Premise

- Regulatory databases are insufficient to fully characterize spectrum usage and occupancy when considering new spectrum allocations.
- Spectrum occupancy and usage measurements can help inform decisions on how to allocate and ultimately share spectrum.
- Experience supporting AWS-3 sharing are presented.

# AWS-3 Measurements: Background

The 1.7 GHz portion of the band was home to extensive federal operations.

CSMAC studied ways to facilitate the implementation of commercial wireless broadband this portion (uplink) of the band.

However, CSMAC study used very conservative assumptions that led to extreme estimated separation requirements.

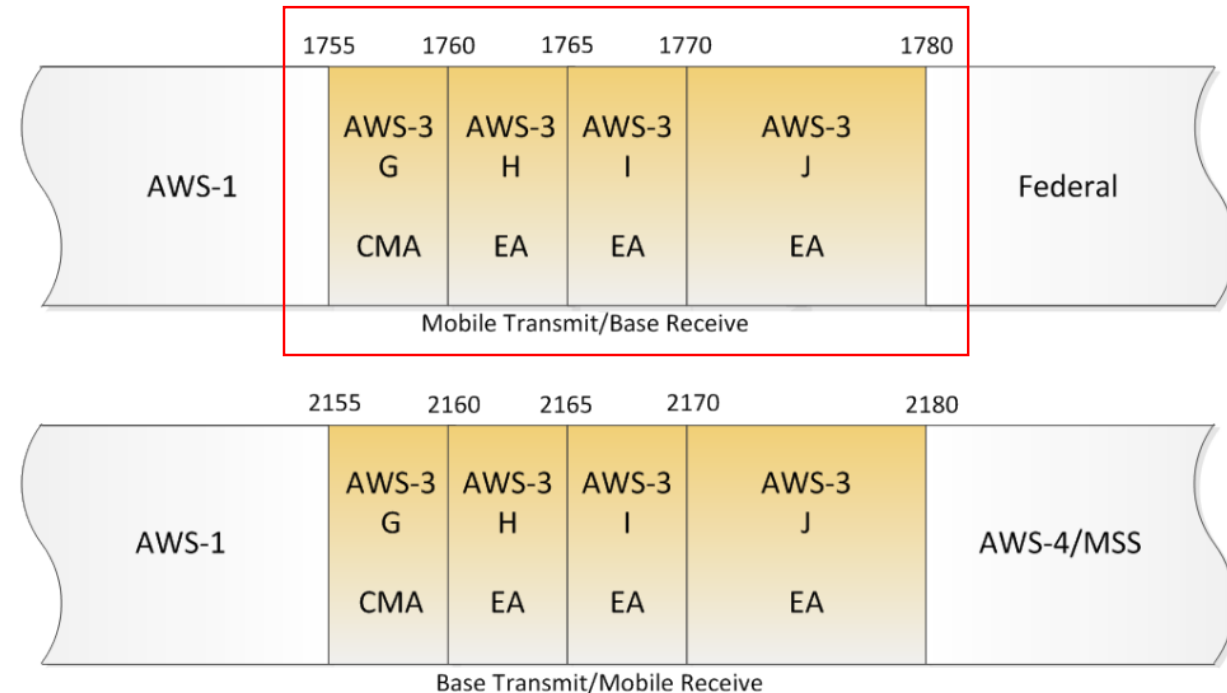
Led to the application of large exclusion zones.

CSMAC reports recognize that refining the analysis could impact results.

Industry sought to acquire real-world information that could be used to verify or refine CSMAC Analysis.

## AWS-3 Band Plan

### 1755-1780 and 2155-2180 MHz





# AWS-3 Measurements: Effort

## Measurement Flight Paths & Altitudes

Airborne spectrum usage measurements provide a basis to more accurately understand interference potential.

We developed a test plan to conduct airborne measurements working with industry representatives and DoD.

The purpose of this measurement program was to characterize the aggregate uplink signal level at several altitudes to assess the potential interference impact to federal aeronautical systems.

Several flight paths were flown at various altitudes to measure uplink emissions in the AWS, PCS, Cellular and 700 MHz bands.

Coordination Zones Should be adjusted to reflect refined analysis.

Rules must provide for coordination zones rather than exclusion zones.



Washington West		Date	Flight Times (Local EST)		Flight Times (GPS)	
Arc Dist (mi)	Altitude (ft)		Start	Stop	Start	Stop
30	3000	10/28/2013	11:11	11:40	15:11	15:40
35	4000	10/28/2013	11:47	12:17	15:47	16:17
50	4000	10/28/2013	12:26	12:48	16:26	16:48
50	6000	10/28/2013	13:13	13:59	17:13	17:59
60	6000	11/8/2013	11:38	12:42	16:48	17:42
60	9000	11/8/2013	12:54	13:38	17:54	18:38
75	6000	11/13/2013	15:46	16:42	20:46	21:42
75	8000	11/13/2013	12:23	13:35	17:23	18:35
75	10000	11/13/2013	11:24	12:15	16:24	17:15
Washington Southeast		Date	Flight Times (Local EST)		Flight Times (GPS)	
Arc Dist (mi)	Altitude (ft)		Start	Stop	Start	Stop
30	3500	11/4/2013	10:55	11:25	15:55	16:25
35	4000	11/4/2013	11:44	12:12	16:44	17:12
50	4000	11/4/2013	12:21	12:43	17:21	17:43
50	6000	11/4/2013	12:46	13:56	17:46	18:56
75	4000	11/11/2013	12:32	13:35	17:32	18:35
75	6000	11/11/2013	11:14	12:26	16:14	17:26
75	8500	11/6/2013	16:37	17:33	21:37	22:33
75	9500	11/6/2013	11:14	12:36	16:14	17:36
Norfolk East		Date	Flight Times (Local EST)		Flight Times (GPS)	
Arc Dist (mi)	Altitude (ft)		Start	Stop	Start	Stop
30	3000	11/6/2013	15:48	16:10	20:48	21:10
35	4000	11/6/2013	13:37	13:59	18:37	18:59



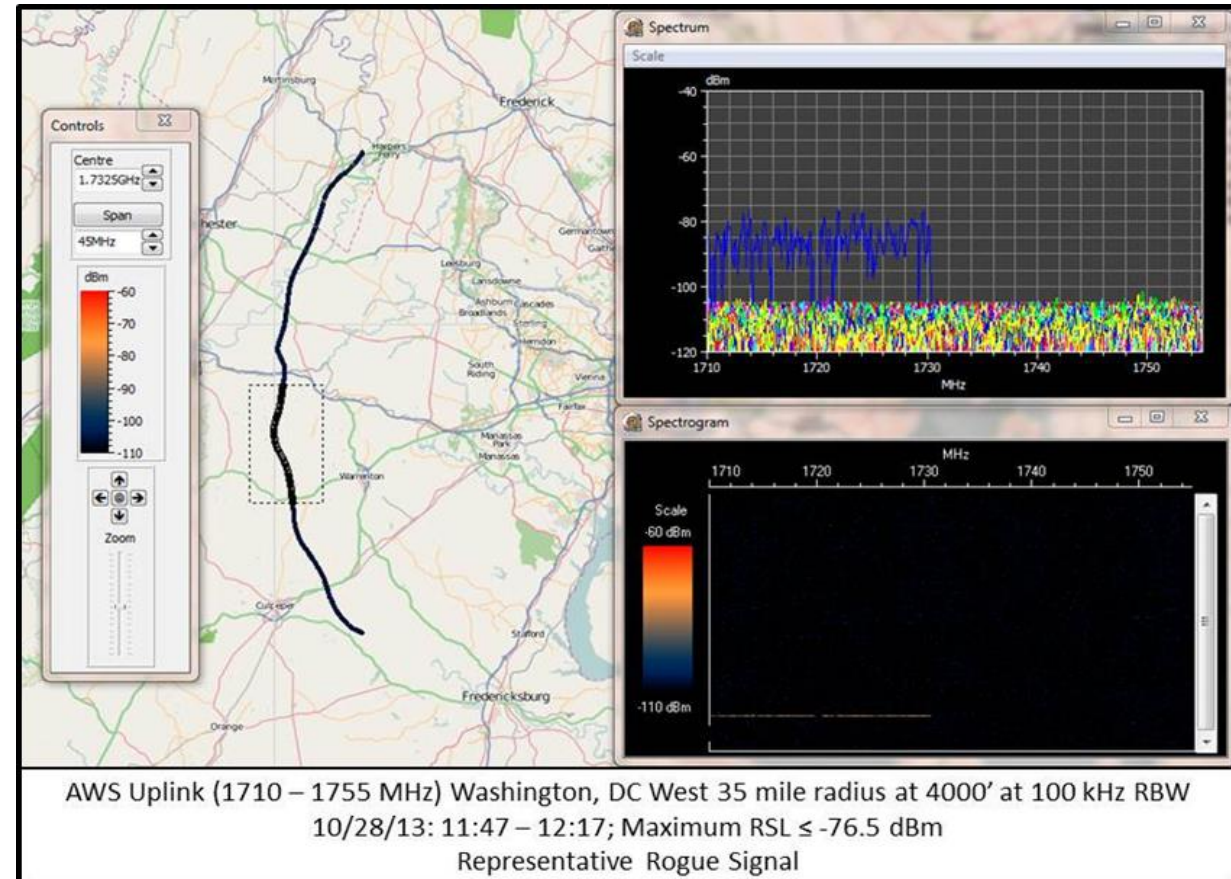
# AWS-3 Measurements: Results

## Representative Airborne Measurements

Prior CSMAC WG models showed that aggregate interference levels caused by UE transmissions would be higher as altitude increased, however, evidence in the measurement data showed otherwise.

Clutter, terrain and antenna characteristics need to be considered in the propagation model when defining coordination and/or protection zone criteria.

Coordination zones rather than exclusion zones are appropriate for sharing.





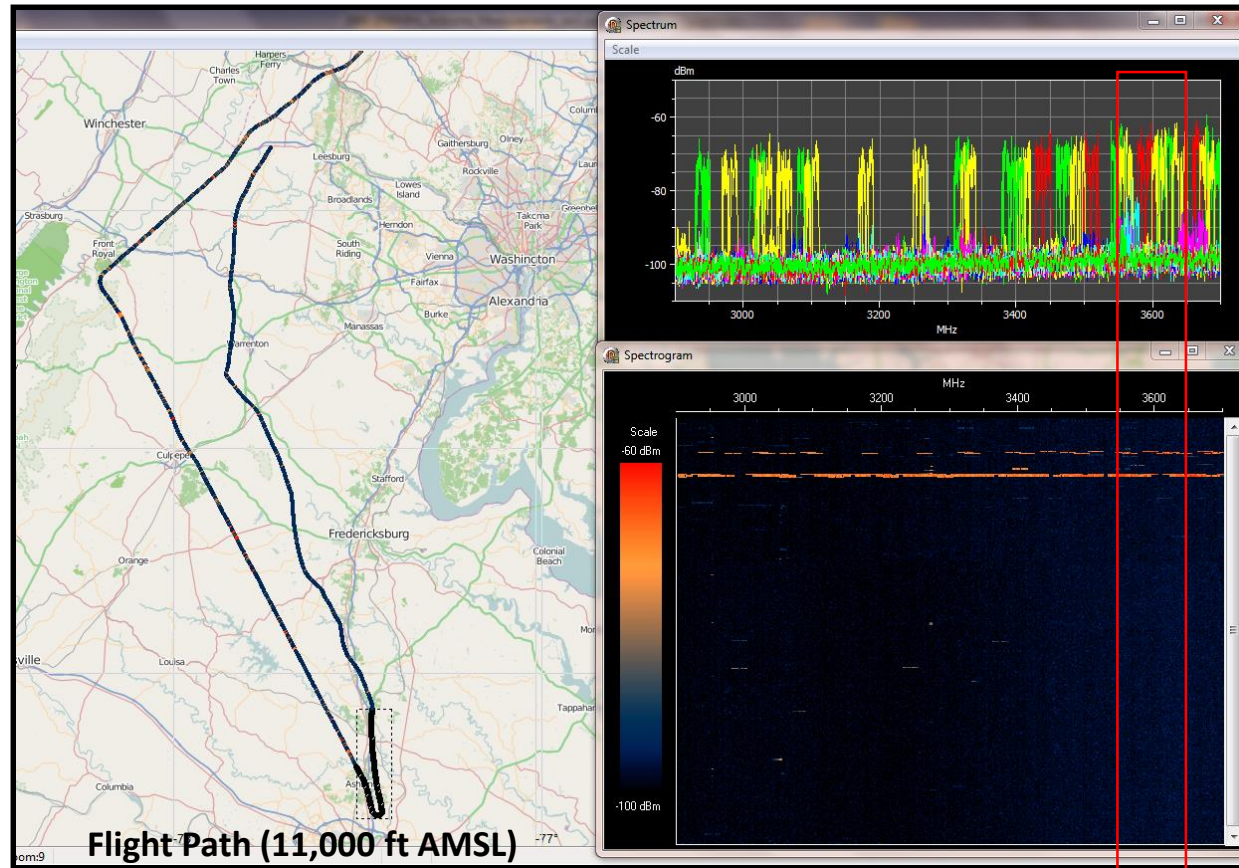
# One More Example: 2900-3700 MHz

Given proximity of our offices to potential SPN-43 radar operation, wanted to conduct an airborne measurement hoping to capture an operating radar at high altitude (11,000 ft agl, horiz dist ~ 150 mi).

Measurements conducted Dec., 2014.

Results indicated the presence of numerous rogue signals.

## Airborne Measurements, 2900-3700 MHz



3550-3650 MHz ↗

# Conclusions

- Reliance on spectrum databases and regulatory information alone when considering new spectrum allocations is often insufficient.
- Spectrum monitoring and usage measurements can be used to better inform allocation considerations, particularly if sharing is being considered.
- Spectrum monitoring is also useful to inform current spectrum usage (whether authorized or not).
- Spectrum occupancy measurements can also be used for interference detection.

A large graphic consisting of a purple rectangle with a diagonal line from the top-left corner to the bottom-right corner. Below this rectangle is a blue trapezoidal shape that tapers to the right, and a solid blue horizontal bar at the bottom left.

Thank you!

Mark Gibson

[mark.gibson@commscope.com](mailto:mark.gibson@commscope.com)